Appl. No. 09/655,755 Amdt. Dated June 7, 2004 Reply to Office action of March 10, 2004 Attorney Docket No. P12103-US1 EUS/J/P/04-2018

This listing of claims replaces all prior versions, and listings, of claims in the application:

Listing of Claims:

A method of designing a digital filter, including the steps of 1. (Original) determining a real-valued discrete-frequency representation of a desired full length digital filter;

transforming said discrete-frequency representation into a corresponding discrete-time representation;

circularly shifting said discrete-time representation; and applying a shortening window to said discrete-time representation to produce a zero-padded reduced length filter.

- The method of claim 1, further including the 2. (Previously Presented) step of circularly shifting said reduced length filter to remove leading zeroes.
- 3. (Previously Presented) The method of claim 1, wherein said realvalued discrete-frequency representation is formed by a noise suppressing spectral subtraction algorithm.
- (Previously Presented) The method of claim 1, wherein said real-4. valued discrete-frequency representation is formed by a frequency selective non-linear algorithm for echo cancellation.
- 5. (Original) The method of claim 1, wherein said window is a Kaiser window.
- 6. (Previously Presented) The method of claim 1, further including the step of transforming said reduced length filter into a minimum phase filter.
 - 7. (Original) A digital convolution method, including the steps of

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determining a real-valued discrete-frequency representation of a desired full length digital filter;

transforming said discrete-frequency representation into a corresponding discrete-time representation;

circularly shifting said discrete-time representation;

applying a shortening window to said discrete-time representation to produce a zero-padded reduced length filter; and

convolving an input signal with said zero-padded reduced length filter.

- 8. (Previously Presented) The method of claim 7, further including the step of circularly shifting said reduced length filter to remove leading zeroes.
- 9. The method of claims 7, further including the (Previously Presented) step of transforming said reduced length filter into a minimum phase filter.
- 10. (Previously Presented) The method of claim 7, including the step of performing the convolution step in the time domain using the discrete-time representation of said reduced length filter.
- 11. (Previously Presented) The method of claim 7, further including the step of performing the convolution step in the frequency domain by using an overlapadd method.
- (Previously Presented) The method of claim 7, further including the step of performing the convolution step in the frequency domain by using an overlapsave method.



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13. (Original) A digital filter design apparatus, including

means for determining a real-valued discrete-frequency representation of a desired full length digital filter;

means for transforming said discrete-frequency representation into a corresponding discrete-time representation;

means for circularly shifting said discrete-time representation; and means for applying a shortening window to said discrete-time representation to produce a zero-padded reduced length filter.

- 14. (Previously Presented) The apparatus of claim 13, further including means for circularly shifting said reduced length filter to remove leading zeroes.
- 15. (Previously Presented) The apparatus of claim 13, wherein said window applying means implements a Kalser window.
- 16. (Previously Presented) The apparatus of claim 13, further including means for transforming said reduced length filter into a minimum phase filter.
 - (Original) A digital convolution apparatus, including

means for determining a real-valued discrete-frequency representation of a desired full length digital filter;

means for transforming said discrete-frequency representation into a corresponding discrete-time representation;

means for circularly shifting said discrete-time representation;

means for applying a shortening window to said discrete-time representation to produce a zero-padded reduced length filter; and

means for convolving an input signal with said zero-padded reduced length filter.

18. (Previously Presented) The apparatus of claim 17, further including means for circularly shifting said reduced length filter to remove leading zeroes.

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- 19. (Previously Presented) The apparatus of claims 17, further including means for transforming said reduced length filter into a minimum phase filter.
- 20. (Previously Presented) The apparatus of claim 17, further including means for performing the convolution step in the time domain using the discrete-time representation of said reduced length filter.
- 21. (Previously Presented) The apparatus of claim 17, further including means for performing the convolution step in the frequency domain by using an overlapadd method.
- 22. (Previously Presented) The method of claim 17, further including means for performing the convolution step in the frequency domain by using an overlapsave method.